## 3.5 PLANTS AND ANIMALS

### 3.5.1 Applicable Sections in FERC Documents

Please refer to Section 3.6 in the FERC Final EIS and Resource Report 3, Fish, Wildlife, and Vegetation, in Exhibit F-1 of GSX-US's original application to FERC.

### 3.5.2 Issue 15: Impacts of Turbidity

**Issue Summary**

Description of Problem

The FERC Final EIS conclusion that turbidity will not affect salmonids or other ocean fish is not documented. On page 3-69, the Final EIS states, "based on the published data, it is unlikely that the locally elevated turbidity generated by pipeline installation would directly affect juvenile or adult salmonids or other marine fish that could be present." No such published data are cited in either this section or in Section 3.6.1 for ocean fish.

Ecology Requirement

Provide citations in the environmental review of the appropriate literature to support the above conclusion.

**Affected Environment**

No additional analysis required.

**Impacts**

Proposed Action

The following citations are referenced on pages 3-63 and 3-65 of the FERC Final EIS, and shown in Appendix M – References, as follows:

Bisson, P. A, and R. E. Bilby. 1982. Avoidance of Suspended Sediment by Juvenile Coho Salmon. North American Journal of Fisheries Management 4:371-374.

Blais, D. P., and D. L. Simpson. 1997. The effects of a buried natural gas pipeline on water quality, stream habitat, and biotic populations within high quality cold water streams in upstate New York. In Sixth International Symposium on Environmental Concerns in Rights-of-Way Management. Eds. J. R. Williams, J. W. Goodrich-Mahoney, J. R. Wisniewski, and J. Wisniewski. February 24-26, 1997. New Orleans, Louisiana. Elsevier Publishers, New York, New York.

Cyrus, D. P., and S. J. M. Blaber. 1987b. The Influence of Turbidity on Juvenile Marine Fishes in Estuaries. Part 2: Laboratory Studies, Comparisons with Field Data and Conclusions. Journal of Experimental Marine Biology and Ecology 109:71-91.

Servizi, J. A. 1988. Sublethal Effects of Dredged Sediments on Juvenile Salmon. Pages 57-63 in C.A. Simenstad, editor. Effects of Dredging on Anadromous Pacific Coast Fishes. University of Washington, Seattle.

Vincour, W. S. and J. P. Shubert. 1987. Effects of gas pipeline construction on the aquatic ecosystem of Canada Creek, Presque Isle County, Michigan. Gas Research Institute Report GRI-87/0027.

Whitman, R. P., T. P. Quinn, and E. L. Brannon. 1982. Influence of Suspended Volcanic Ash on Homing Behavior of Adult Chinook Salmon. Transactions of the American Fisheries Society 111:63-69.

Terasen Gas Alternative

No analyses on the potential impacts of turbidity are available for the Terasen Gas Alternative.

No Action Alternative

No analyses on the potential impacts of turbidity are available for the NorskeCanada proposal.

**Mitigation Measures**

Proposed Action

No additional analysis required.

Terasen Gas Alternative

No additional analysis required.

No Action Alternative

No additional analysis required.

**Significant Unavoidable Adverse Impacts**

No additional analysis required.

### 3.5.3 Issue 16: Non-Listed Federal and State Species~~2~~

**Issue Summary**

Description of Problem

The FERC response to Draft EIS comments LA1-13 and 14 with respect to non-listed federal and state species is not adequate. The only marine fish species discussed in Section 3.6.2 that are not mentioned in the Essential Fish Habitat species listed in Table 3.6.3-1 are Pacific herring, surf smelt, and (Pacific) sand lance. Species such as Puget Sound rockfish, rock greenling, white-spotted greenling, wolf eel, and all the sculpin species (except cabazon) that could be affected are not mentioned anywhere.

Ecology Requirement

Summarize and include information from Appendix 3-1 of Resource Report 3, Fish, Wildlife, and Vegetation, in Exhibit F-1 of GSX-US's original application to FERC and information from the surveys of subtidal benthic biodiversity and associated habitats along the proposed Georgia Strait pipeline route in the SEPA document.

**Affected Environment**

Information on marine fish in the project area was provided in Resource Report 3, Appendix 3-1, Section 2.2. The reference for this report is:

Fairbanks, C. and M. Terra. 2000. Georgia Strait Crossing Project nearshore marine habitat survey and review of existing information of marine biology and fisheries resources. Tech. rep. by Duke Engineering & Services for WESTECH Environmental Services, Inc.

Additional marine fish information was collected during two remotely operated vehicle surveys sponsored by GSX-US. The reference for this report is:

McDaniel, N.G. and R. Glaholt. 2002. Surveys of subtidal benthic biodiversity and associated habitats along the proposed Georgia Strait Crossing pipeline route. Tech. rep. by TERA Environmental Consultants for Georgia Strait Crossing Pipeline Ltd.

**Impacts**

Proposed Action

No additional analysis required.

Terasen Gas Alternative

No analyses of marine fish were available for the Terasen Gas Alternative.

No Action Alternative

No analyses of marine fish were available for the NorskeCanada proposal.

**Mitigation Measures**

Proposed Action

No additional analysis required.

Terasen Gas Alternative

No additional analysis required.

No Action Alternative

No additional analysis required.

**Significant Unavoidable Adverse Impacts**

No additional analysis required.

### 3.5.4 Issue 17: Impacts to Fisheries~~3~~

**Issue Summary**

Description of Problem

The Final EIS does not discuss impacts on the fishing industry, and specifically the potential significant impact on the bottom trawl fishery. Further, no mitigation measures were recommended.

Ecology Requirement

Include a discussion of fishing issues, impacts, and mitigation measures in the environmental review should. More thoroughly evaluate and discuss the cumulative effect the project would have on the sea bottom and bottom trawling.

**Affected Environment**

No additional analysis required.

## Impacts

GSX-US

In February 2001, GSX-US met with WDFW personnel at the WDFW's La Conner field. One of the specific objectives of this meeting was to discuss offshore fishing areas in relation to the marine alignment sheets. WDFW personnel stated that fishing pressure in the vicinity of the project is heaviest comparatively close to the Washington coast. Farther offshore in the Georgia Strait, fishing pressure is not as intense near the proposed marine pipeline route as it is farther to the north. The commercial fishing areas were identified in Resource Report 3 (refer to Figures 3.1-1, 3.1-2, and 3.1-3, and accompanying text).

In December 1999, the Applicant communicated with a commercial fisherman via telephone. The fisherman expressed concern about the pipeline interfering with bottom fishing efforts, and particularly damage to or from the pipeline on fishing gear. As a follow up to this conversation, GSX-US met with three commercial fishermen, including a crab fisherman, in Bellingham, in January 2000. At that meeting, the fishermen again expressed concerns about bottom trawl gear encountering the pipeline. They stated that they generally fish in waters varying from about 120 to 720 feet deep, but that their operations are confined to the first eight miles of the marine pipeline route. They stated that they didn't think the remainder of the U.S. portion of the marine route would greatly affect commercial fishermen. This comment was consistent with the information on fishing pressure provided by WDFW during the February 2001 meeting.

The crab fisherman stated that most crab fishing is done in waters varying from about 24 to 300 feet in depth and expressed concerns about crabs being able to cross a pipeline lying on the bottom. During a meeting in April 2000, WDFW personnel stated that most commercial and recreational crab fishing occurs in water less than 100 feet deep. This communication was also reported on page 3-6 in Resource Report 3. However, as reported on page 3-6 of Resource Report 3, the Cherry Point area has a comparatively small commercial crab harvest. In response to crab fishing concerns raised by both U.S. and Canadian parties, the Applicant sponsored a study to assess the potential for a pipeline to act as a barrier to crabs and certain other invertebrates. The findings of that study, contained in Appendix 3-1 of the Resource Report 3, are summarized below.

*Disruption of Commercial or Recreational Fishing*

Construction of the pipeline has the potential to temporarily disrupt commercial and recreational fishing (marine construction of the pipeline is expected to take about 30 days). GSX-US identified the primary commercial fishing areas in Resource Report 3 and provided an additional discussion of the fisheries resources and commercial fishing in Appendix 3-1 of Resource Report 3. During pipe laying and trenching operations, fishermen will be less likely to fish in proximity to the moving construction spread. Crab fisherman active in the area during construction may be forced to pull gear to avoid it from being damaged or lost. However, because the vessels directly involved in pipeline construction will move very slowly (approximately one mile per 24-hour period), it is expected that commercial and recreation fishermen will be able to readily avoid gear losses resulting from construction vessels.

Impacts to the fishing industry after the pipeline is in operation are also expected to be minor. Although pipelines sometimes do interfere with fishing gear, it has also been reported that pipelines are fished by some trawlers, since some minor artificial reef effect may occur whereby fish congregate and greater catch rates may occur (DTI Oil and Gas Environmental Consultation Site 2003). Evidence suggests that pipelines up to 40 inches in diameter cause only minimal gear damage. However, they may affect the gear geometry and efficiency once past the obstruction (Valdemarsen 1993). Seabed evaluations conducted by GSX-US consultants identified blocks and boulders greater than 2.5 feet in diameter along the pipeline route. These are natural obstructions on the seabed that fishermen normally have to contend with (Jacques Whitford and Associates 2002; Terra Remote Sensing Inc. 2001).

*Impacts to Fisheries Resources*

Impacts to marine fisheries were discussed on pages 3-68 through 3-88 of the FERC Final EIS. GSX-US also discussed potential impacts in Resource Report 3. GSX-US recognizes that any project activities that significantly affect marine biota also have the potential to effect commercial and recreational fisheries.

GSX-Canada

Potential environmental effects to fish from pipeline activities identified by GSX-Canada in its environmental assessment included direct effects through turbidity and mortality; habitat alteration; and sensory disturbance. Soft-bottom fish habitats could be temporarily altered as a result of pipe trenching.

GSX-Canada contended that most adult fish have sufficient mobility to avoid being crushed by pipe lay and trenching operations. In addition, most potentially affected fish species have free-floating, often pelagic eggs and larvae, which should also not be vulnerable to burial or substantial direct mortality. GSX-Canada also predicted that rapid sediment covering of the pipe in the trench and subsequent more gradual natural infill of the trench would result in the functional restoration of the structural and biological productivity of these communities for fish. Where the pipeline is exposed, new long-term hard-bottom substrate would be created on the seabed. In these areas, a reef effect would likely occur and the pipe could be expected to be colonized to varying degrees by, or to attract, otherwise, a variety of fish species (e.g., rockfish, sculpin, and lingcod).

In its report, the Joint Review Panel concluded that potential effects of turbidity and mortality, habitat alteration, and sensory disturbance to deepwater marine fish from the proposed GSX-Canada pipeline would not be significant (National Energy Board 2003).

Terasen Gas Alternative

No analyses of fisheries impacts were available for the Terasen Gas Alternative.

No Action Alternative

No analyses of fisheries were available for the NorskeCanada proposal.

**Mitigation Measures**

Proposed Action

Based on the information available for commercial fishing as well as other project concerns, GSX-US proposed several mitigation measures to address the concerns raised by commercial fishing interests, including:

- One of the criteria used to select the marine route location was to minimize, to the extent practicable, the distance traversed through known important marine areas. Due to the extent of the commercial fishing areas along the northwest Washington coast (refer to Figures 3.1-1, 3.1-2 and 3.1-3 in Resource Report 3), it would not be possible to avoid these areas altogether. However, much of the route proposed by GSX-US traverses areas of less intense commercial fishing pressure (page 3-18 of Resource Report 3), as identified by both the Washington State agencies and commercial fishermen.
- GSX-US recognized (page 3-14 of Resource Report 3) that construction of the marine portion of the pipeline could interfere with commercial or recreational fishing. However, due to the comparatively small size of the area affected by pipeline construction activities at any one time, GSX-US believes that this impact would not be substantial.
- GSX-US has proposed to use the HDD technique to install the pipeline from onshore in the Cherry Point area to a depth of –130 feet mean lower low water (MLLW). This depth would avoid or minimize effects to nearshore marine habitats that are recognized for their value to commercial and recreational fishing resources, as well as other resource values
- On page 3-16 of Resource Report 3, GSX-US reported the results of a study to determine the barrier effects of a pipeline to crabs and other marine invertebrates. This study concluded that a 21-inch pipeline, buried to one-half its diameter, would not constitute a substantial barrier to the movement of crabs. As discussed on pages 3-15 and 3-16 of Resource Report 3, it is anticipated that the pipeline would settle into the bottom sediments relatively quickly, and that sediment transported along the bottom by marine currents would eventually accumulate around the pipeline. However, GSX-US has proposed to place the pipeline in a shallow trench to a depth of approximately –240 feet MLLW for the first 5.6 miles of the marine route. This burial would ensure that the pipeline does not constitute a barrier to crab movement over most of the fishing depths reported by commercial fishermen, and the depths identified as most important for crab fishing identified by the WDFW.
- The pipe would have a 1.6-inch thick, wire reinforced concrete coating, which will provide additional protection from potential impacts of trawling gear.
- The pipeline would be identified on navigational charts and precautions similar to those for avoiding other existing features (e.g., cables, boulder fields, rock outcrops) would need to be taken by fisherman in the area.
- During pipeline construction, support vessels will act as pilot boats ensuring that fishing vessels are forewarned of the construction activities;

- A general awareness of the pipeline through meetings already held with resource users and a Notification to Mariners prior to construction will further reduce encounters with the pipeline; and
- To notify small boat traffic, notices will be placed at marinas and in local newspapers. The U.S. Coast Guard will be notified and will communicate the location of the construction vessels to inbound and outbound vessels in the project area.

Terasen Gas Alternative

No analyses of marine fish were available for the Terasen Gas Alternative.

No Action Alternative

No analyses of marine fish were available for the NorskeCanada proposal.

**Significant Unavoidable Adverse Impacts**

With the use of specialized construction, and incorporation of proposed mitigation, significant adverse impacts would not be expected.

### 3.5.5 Issue 18: Noxious Weeds/Invasive Species4

**Issue Summary**

Description of Problem

The Final EIS states that Class B and C noxious weeds were observed along the proposed route, but does not tell the reader which ones were observed. The analysis does not contain conclusions about whether the proposed project would increase or decrease the prevalence of noxious weeds/invasive species in the project area. The document states that a control plan would be developed. However, without details on what methods (e.g., herbicides, manual removal, surface treatments) would be used, it is difficult to defend a conclusion that weeds would not spread because of the project. It is very likely that any new pipeline right-of-way in Whatcom County has a high likelihood of becoming dominated by invasive species without aggressive maintenance.

Ecology Requirement

Colonization of invasive weed species is frequently a problem in pipeline corridors. Identify the noxious weeds observed during field surveys in the environmental review and analyze impacts to discuss fully the potential effects of the project. Also, evaluate and discuss potential mitigation measures to address these impacts more fully.

## Affected Environment

Table 3.3-2 on page 3-65 of Resource Report 3 identifies the noxious weeds observed during resource surveys, including Class B and C weeds. The Resource Report also describes locations in the project area where noxious weeds were most concentrated.

## Impacts

Proposed Action

The Resource Report also states "where noxious weeds are already established, they will likely invade the right-of-way." Based on this statement, and the fact that resource surveys observed 16 different species of Class B and C noxious weeds, it is reasonable to conclude that the proposed pipeline will increase the risk of spread for at least some of these species, particularly in areas of new right-of-way. In particular, many riparian and wetland areas adjacent to the proposed right-of-way are infested with reed canarygrass. Any removal of tree and shrub cover is likely to favor this species.

Terasen Gas Alternative

No analysis of noxious weeds is available for the Terasen Gas Alternative.

No Action Alternative

No analysis of noxious weeds is available for the NorskeCanada proposal.

## Mitigation Measures

Proposed Action

GSX-US prepared a Noxious Weed Management Plan and submitted the plan to Whatcom County and Ecology. Page 3-40 of the Final EIS states that the applicant "will focus weed control measures where noxious species are confined to isolated stands within the right-of-way" to prevent new outbreaks. The weed management plan should include measures appropriate to control noxious weeds in upland and wetland conditions. Where application of herbicides is allowed (i.e., uplands), this method would likely be effective in controlling the spread of noxious weeds. Where application of soluble chemicals is prevented by FERC conditions (i.e., within 100 feet of wetlands), manual removal and installation of native plants would be recommended to control the spread of noxious weeds, particularly reed canarygrass.

Terasen Gas Alternative

No analysis of noxious weeds is available for the Terasen Gas Alternative.

No Action Alternative

No analysis of noxious weeds is available for the NorskeCanada proposal.

**Significant Unavoidable Adverse Impacts**

Implementation of a noxious weed management plan with the characteristics described above would be expected to minimize potential negative environmental impacts from noxious weeds along the proposed right-of-way.

### 3.5.6 Issue 19: Access Road Impacts to Wetlands~~5~~

**Issue Summary**

Description of Problem

The Final EIS indicates that GSX-US would need a variance from FERC for access roads or staging areas that disturb wetlands. The Final EIS acknowledges that four access roads and the Gulf Road pipestring fabrication would affect wetlands. However, no details are provided regarding the extent of the potential impacts.

Ecology Requirement

Include the information on the Preliminary Construction Alignment Sheets regarding the change of the access road to avoid wetlands in the SEPA document.

**Affected Environment**

No additional analysis required.

**Impacts**

Proposed Action

At the request of FERC, GSX-US revised its plans in order to avoid the placement of fill materials for access roads in wetlands. In one case, GSX-US relocated an access road from a location outside the construction right-of-way to a location within the right-of-way in order to avoid placement of fill in a wetland. The revised access road alignments are shown on the updated Preliminary Construction Alignment Sheets provided to Ecology and the EIS consultant.

GSX-Canada

The proposed GSX-Canada pipeline route traverses eight wetlands greater 0.02 acres in size that were documented and characterized in the vegetation assessment of the project area. The proposed route does not traverse any wetlands designated for the Cowichan subunit of East Vancouver Island (GSX-Canada, Volume 4, Section 5, pg. 28. April 2001).

Terasen Gas Alternative

No analysis of potential wetland impacts is available for the Terasen Gas Alternative.

No Action Alternative

No analysis of potential wetland impacts is available for the NorskeCanada proposal.

**Mitigation Measures**

Proposed Action

No additional analysis required.

Terasen Gas Alternative

No analysis of potential wetland impacts is available for the Terasen Gas Alternative.

No Action Alternative

No analysis of potential wetland impacts is available for the NorskeCanada proposal.

**Significant Unavoidable Adverse Impacts**

No additional analysis required.

### 3.5.7 Issue 20: Wetland Mitigation Plan~~6~~

**Issue Summary**

Description of Problem

The Final EIS states that the compensatory wetland mitigation plan has been filed with the U.S. Army Corps of Engineers and Ecology. While incorporated by reference, it is not readily available to the public for review.

Ecology Requirement

The Applicant will provide a summary of the wetland restoration plan for inclusion in the SEPA document.

**Affected Environment**

No additional analysis required.

**Impacts**

Proposed Action

No additional analysis required.

Terasen Gas Alternative

No additional analysis required.

No Action Alternative

No additional analysis required.

**Mitigation Measures**

Proposed Action

*Mitigation Approach*

Waterbody and wetland crossings have been avoided where possible. Where unavoidable, measures have been implemented to minimize impacts. Measures to avoid and minimize impacts include:

- Trenchless methods (horizontal directional drilling or conventional boring) will be used where technically feasible to cross important streams (and adjacent wetlands) as determined through consultation with WDFW biologists.
- Drill and bore entry and exit points were located outside forest and scrub-shrub wetlands to the extent possible.
- Valve site locations or layout areas were selected or designed to avoid permanent fill in wetlands.
- The Cherry Point compressor station was relocated from its originally proposed location to avoid permanent fill in a palustrine emergent wetland.
- The alignment and extra work space were designed or modified where possible to avoid wetlands.
- Staging areas, pipe storage sites and other ancillary facilities were selected in upland sites.
- Existing pipeline, road and powerline corridors were followed for most of the route.
- The construction right-of-way was narrowed from 100 to 75 feet (except in agricultural wetlands and certain extra workspace areas).
- Design was modified to minimize extra workspace in wetlands.
- The route was selected to avoid forested wetlands where possible.

This summary and the more detailed Wetland and Riparian Restoration Plan present GSX's proposed mitigation plans to restore waterbody/riparian areas and wetlands that could not be avoided during construction. The mitigation approach for unavoidable impacts includes onsite

restoration, compensatory mitigation for non-riparian wetlands and compensatory mitigation for riparian areas.

*Onsite Restoration*

Onsite restoration will be implemented so that no net loss of acreage is associated with riparian areas or wetlands. Riparian and wetland functions, however, will be temporarily affected, especially in shrub- and tree-dominated areas. Functions will also be affected during the life of the project as a 10-foot wide zone centered over the pipeline is maintained in herbaceous vegetation and woody plants are limited to a 15-foot height in a 30-foot wide zone centered over the pipeline.

The primary goal of restoration is to reestablish vegetation communities comparable to those impacted by proactively seeding and planting native species that are present in riparian areas and wetlands disturbed by the project. Wetland and Waterbody Construction and Mitigation Procedures were presented in the Georgia Strait Crossing Project Final EIS. Those procedures were revised October 2002. Restoration prescriptions are presented in the Wetland and Riparian Restoration Plan. Site-specific restoration specifications have been developed for named streams including all streams with fisheries. Typical restoration specifications will be applied to minor tributaries, ditches and non-riparian wetlands.

Woody riparian vegetation occurs at 28 of the waterbodies that will be crossed during construction, 7 of which will be crossed using trenchless methods and 8 of which are ditches with only a few scattered shrubs or trees. Where it occurs, woody vegetation will be cut off at ground level within the construction right-of-way. Tree stump removal and grading activities will be limited to directly over the trench, however, stumps or root systems not affected by trench excavation will be left in the ground to provide streambank stability. Streambanks will be stabilized and temporary sediment barriers installed within 24 hours of completing the crossing. Bank stabilization will be completed prior to returning flow to the channel. All streambanks, channelized streams and ditches will be restored to their approximate original contours.

All streambeds and ditch bottoms will be restored to their original configuration. Clean gravel will be used for the upper 1 foot of trench backfill in the streambeds of selected waterbodies that contain fisheries. Remaining water bodies with identified fisheries will be crossed using trenchless methods. Clean gravel will also be used in the upper 1 foot of trench backfill in the streambeds of open-cut impaired waterbodies (303[d] listed sites) to stabilize the trenchline and reduce potential sedimentation.

Woody debris will be placed in the floodplains of selected waterbodies to increase biologic diversity for plants and animals, provide protection for establishing vegetation, contribute complexity to the floodplain, and increase floodplain roughness, thereby decreasing potential overbank flow velocities and resultant avulsion.

Topsoil will be respread over those areas from which it was stripped; redistribution depths will vary depending on stripping depths. Topsoil will not be mixed with spoil material at any time during salvage or replacement activities. Amendments (lime, fertilizer, mulch) will not be

applied to redistributed soils. GSX-US will cross agricultural wetlands in a manner consistent with the way the land is normally managed for agriculture. Soils that have been compacted, are heavily crusted or consist of large clods will be chisel plowed, disced, or harrowed, depending on equipment limitations. The seedbed will be left in a roughened condition adequate to capture precipitation, reduce runoff, and provide microsites for seed germination.

Three revegetation types that include primarily hydrophytic species present in non-agricultural preconstruction communities will be established: Herbaceous Wetland, Shrub Wetland, and Forested Wetland. The Herbaceous Wetland revegetation type is a composite of existing palustrine emergent plant communities on the project. The Shrub Wetland and Forested Wetland revegetation types are equivalent to palustrine scrub-shrub and palustrine forest communities present on the project.

Proposed seeding and planting specifications are described in detail in the Wetland and Riparian Restoration Plan. Commodity crops in agricultural lands will be revegetated according to landowner preference. Where the GSX disturbance corridor overlaps existing cleared rights-of-way, herbaceous species that reflect existing vegetation on those rights-of-way will be seeded.

Permanent erosion and sediment control measures primarily include established vegetation cover and water bars. Erosion control fabrics will be applied to some areas to provide interim erosion control until vegetation cover has been established. The use of mulch is not proposed at waterbody/riparian or wetland areas. All existing non-agricultural riparian buffer zones that are disturbed will be revegetated with appropriate native species.

The construction schedule across waterbodies will be in compliance with waterbody timing windows described in the Final EIS. In-stream construction activities are limited to the period from June 15 to September 1 for those waterbodies known to contain chinook salmon and from June 15 to October 15 for all other waterbodies with fisheries. In general, waterbodies will be crossed during periods of low flow that will avoid periods of resident and spawning species' life cycles. Wetlands are proposed to be crossed during the summer/fall season when water levels should be lower. Revegetation activities will be determined by construction schedules, seasonal climatic conditions and site conditions. Seeding and planting will be coordinated with other reclamation activities to occur as soon after seedbed preparation as possible, weather and soil conditions permitting, ideally during the locally recognized planting season (September 15 to October 15).

Restored waterbodies/riparian areas and wetlands will be protected utilizing traffic management, maintained erosion and sediment control structures, fencing, selective vegetative maintenance, and noxious weed control. Monitoring and inspection will be conducted during construction/restoration activities to ensure environmental compliance. Following construction and restoration, the GSX pipeline right-of-way will be evaluated to assess revegetation success, and the effectiveness of erosion and sediment control measures. The right-of-way will also be patrolled from the air on a regular basis.

*Compensatory Wetland Mitigation*

To compensate for the temporary and life-of-project changes in wetland functions, a compensatory wetland mitigation area is being developed. A Preliminary Compensatory Wetland Mitigation Plan was provided to the regulatory agencies in April 2002. The preliminary plan was revised to address comments from the Corps (May 5, 2003) and resubmitted to the Corps. Comments from Ecology (May 29, 2003) were responded to by letter with a commitment to provide additional compensatory wetland mitigation.

The compensatory wetland mitigation site is located along the pipeline route just east of Kickerville Road on land owned by GSX-US (Figure 3-2). The site is currently palustrine emergent wetland, herbaceous upland and recently logged upland forest. The existing herbaceous wetland will be enhanced by shrub and tree plantings, and control of reed canarygrass. Not less than 7.0 acres of forest and scrub-shrub wetland will be developed at this site. In order to meet Ecology's recommended replacement ratios, 9.0 acres of additional wetland enhancement is necessary. The search for another mitigation site has begun, and a similar approach will be proposed on the new site as described above for the Kickerville Road site. Both sites will be monitored for 10 years to ensure mitigation success.

*Compensatory Riparian Mitigation*

To compensate for the temporary and life-of-project changes in riparian functions, a compensatory riparian mitigation area will be developed. The compensatory riparian mitigation site is located along the pipeline route just west of Jackson Road and east of the proposed Cherry Point compressor station on land owned by GSX-US (Figure 3-3). The site is a tributary to Terrell Creek with a narrow palustrine emergent wetland along the stream and hay meadow either side of the stream. The site will be planted with trees and shrubs creating 2.2 acres of woody riparian vegetation, of which 0.6 acre will be palustrine forested wetland and 1.6 acres will be non-wetland riparian forest. Plantings will be monitored in conjunction with the compensatory wetland mitigation area to ensure adequate tree and shrub survival.

GSX-Canada

The proposed GSX-Canada pipeline route traverses eight wetlands greater 0.02 acres in size that were documented and characterized in the vegetation assessment of the project area. The proposed route does not traverse any wetlands designated for the Cowichan subunit of East Vancouver Island. Any wetlands that cannot be avoided will be restored during reclamation (GSX-Canada, Volume 4, Section 7, pg. 86. April 2001).

Terasen Gas Alternative

No analysis of potential wetland impacts is available for the Terasen Gas Alternative.

No Action Alternative

No analysis of potential wetland impacts is available for the NorskeCanada proposal.

**Significant Unavoidable Adverse Impacts**

With the use of proposed construction techniques, and incorporation of proposed mitigation, significant adverse impacts would not be expected.

### 3.5.8 Issue 21: HDD Impacts to Marine Plants and Animals~~7~~

**Issue Summary**

Description of Problem

The Final EIS did not adequately address potential impacts to marine vegetation and animals/organisms.

Ecology Requirement

Perform a survey and impact analysis of marine vegetation and animals/organisms, and a mitigation plan prepared and summarized in the SEPA document. Address contingencies for potential impacts to the aquatic reserve in the analysis.

**Affected Environment**

No additional analysis required.

**Impacts**

GSX-US

An analysis of potential impacts to marine vegetation and animals/organisms was included on page 3-83 of the FERC Final EIS. A discussion of existing conditions and potential impacts to marine fisheries, wildlife and vegetation resources was also reported in Resource Report 3 of the Environmental Report. The results of a survey of marine vegetation and animals/organisms in the nearshore environment was included in Appendix 3-1 of Resource Report 3.

GSX-Canada

Potential marine environmental effects associated with the HDD for the GSX-Canada project relate primarily to the permanent loss or temporary disturbance of eelgrass habitat. The major impact area would be in the vicinity of the HDD exit hole where suspended sediment and bentonite drilling muds could be transported to nearby eelgrass. Sustained high suspended sediment levels could impair ecological function. Concerns were also expressed about potential effects on nearshore habitat from vessel operation and anchoring. In addition to suspended sediment, concerns were expressed about the potential toxicity of the drilling mud and the viscosifer agent to be used at the HDD marine exit point.

Figure 3-2: Compensatory Wetland Mitigation Site

Figure 3-3 Compensatory Riparian Mitigation Site

In the event that the Vancouver Island shoreline crossing cannot be accomplished using HDD, a partial HDD or full open cut method would be employed. A partial HDD or full open cut of the landfall would raise many of the environmental issues the HDD is intended to avoid. The partial HDD and the full open cut would require excavation through the foreshore area including shallow subtidal and intertidal zones.

For a full open cut, forest cover on the slope would be cleared from the right-of-way and a dragline or equivalent excavator used to trench the slope. In the absence of an intensive bank stabilization and reclamation effort following full open cut construction, chronic erosion and increased foreshore siltation and turbidity could occur. This outcome would result in proportionately more long-term effects on marine vegetation (National Energy Board 2003).

Terasen Gas Alternative

Looping of the existing Terasen Gas pipeline will involve crossing a number of small streams and two major rivers: the Indian River and Squamish River. The two river crossings will be accomplished with directional drilling, the technique used for installation of current pipeline in 1989. Potential impacts associated with these crossings are expected to be similar to those for the GSX-US and GSX-Canada projects. However, the Terasen Gas Alternative does not call for the crossing of any marine shoreline (Terasen Gas 2003).

No Action Alternative

The NorskeCanada proposal does not call for pipeline construction.

**Mitigation Measures**

GSX-US

GSX-US acknowledges that it may be necessary, pending the consultation with the WDNR, WDFW, NMFS and other applicable agencies required under FERC Condition 21, to repeat its survey of exiting conditions prior to construction in order to have the most recent data available for the post-construction analysis. If such a survey is required, it would be conducted after the HDD is completed. This is based on the language in FERC Condition 21 that requires the applicant to "…prepare a plan in consultation with…agencies to mitigate observed impacts." As an initial step, an assessment would be made to determine if the HDD had any impact on marine vegetation. Observed impacts would then be mitigated, in consultation with the state and federal resource agencies (Williams Pipeline Company 2003).

GSX-Canada

To ensure that proposed avoidance and mitigation measures are implemented successfully, the Joint Review Panel recommended that GSX-Canada provide a detailed site-specific environmental management plan prior to initiating HDD activities at the Manley Creek landfall. Furthermore, the Panel expects that GSX-Canada would include in the plan a provision to conduct a post-construction survey to quantify the predicted effect associated with the use of the

drilling mud on marine vegetation at the HDD site and discuss options to mitigate any effects. The Panel concluded that, with the implementation of the proposed mitigation measures and the Panels' recommendation, significant adverse environmental effects from the HDD would be unlikely.

In the event of a failed HDD, the Joint Review Panel accepted the reclamation and restoration measures outlined in GSX-Canada's contingency plan for a partial HDD or open cut. However, to ensure the management of potential effects during construction, the Panel recommended that GSX-Canada not proceed with the partial HDD or open cut method at the landfall without developing a detailed site-specific crossing plan and an eelgrass monitoring plan that receives approval from the National Energy Board. The Panel concluded that, with the implementation of GSX-Canada's proposed mitigation measures and the Panel's recommendation, significant adverse environmental effects of a partial HDD or open cut would be unlikely (National Energy Board 2003).

Terasen Gas Alternative

Terasen Gas's existing pipeline corridor was chosen in 1989 on the basis of geotechnical, environmental, land use, and property ownership considerations consistent with current route selection techniques. Geotechnical considerations were particularly important in the selection of the original route. These considerations included topography, surficial geology, surface and subdrainage, and slope stability. The selection of the best route from a geotechnical standpoint was also important to minimize erosion and sedimentation problems. The original crossing of the Squamish River, considered to be the most environmentally sensitive crossing, successfully used the directional drilling technique. The results of Terasen Gas's original studies and construction techniques would be applied to the proposed pipeline looping projects.

No Action Alternative

The NorskeCanada proposal does not call for pipeline construction.

**Significant Unavoidable Adverse Impacts**

With the use of specialized construction, and incorporation of proposed mitigation, significant adverse impacts would not be expected.

### 3.5.9 Issue 22: Measures to Protect Bald Eagles~~8~~

**Issue Summary**

Description of Problem

On page 3-98 of the Final EIS, the text lists recommended mitigation measures for impacts on bald eagles. These measures do not include avoidance of important bald eagle breeding and wintering forage periods when GSX-US would conduct pipeline maintenance in the future.

Ecology Requirement

Because supplemental bald eagle surveys will not be conducted until after the SEPA process is concluded, summarize information from Resource Report 3 and from WDFW's Bald Eagle Management Plan in the Supplemental EIS.

**Affected Environment**

GSX-US

According to Resource Report 3 and WDFW's Bald Eagle Management Plan, one bald eagle nest is located within 0.5 miles of the proposed pipeline route, which is within the California Creek territory, #1405. This nest was discovered during follow-up bald eagle surveys in 2001 and 2002. The proposed pipeline would be 60 feet from the nest tree, and the proposed workspace would be within 40 feet of the tree. In addition, during a site visit by Shapiro and Associates, Inc., Department of Ecology, and Williams Pipeline personnel on February 20, 2003, at least eight adult and juvenile bald eagles were observed roosting in a stand of mixed conifers and hardwoods adjacent to the proposed right-of-way crossing of Bertrand Creek. This site has not been verified as a regular roosting concentration by WDFW or USFWS.

GSX-Canada

Bald eagles occur year-round in the GSX-Canada project area and are a listed species of concern in Canada. Most of the project area has moderate to high capability for bald eagle nesting according to published studies. However, several factors have either directly or indirectly acted to reduce the suitability of many areas for that purpose, especially in the eastern half of the project area. Logging and land clearing undoubtedly removed a large number of potential nesting and perching trees. Intensive human activities may have the effect of reducing the suitability of remaining nesting areas in the eastern portion of the project area. No active or inactive bald eagle nests or bird observations were observed during the breeding bird survey. Five bald eagle observations were made during the wildlife study (GSX-Canada, Volume 4, Section 5, pg. 46. April 2001).

**Impacts**

GSX-US

Given their close proximity, construction and operation of the proposed pipeline is very likely to disturb bald eagles actively breeding at the California Creek nest or roosting adjacent to Bertrand Creek. While bald eagles have shown considerable ability to acclimate to ongoing human activities, the proposed construction would be an unusual activity that does not normally occur in the vicinity of the California Creek territory. Therefore, the activity would be more likely to disturb breeding birds. Maintenance of the proposed pipeline would be less likely to disturb nesting eagles. However, depending on the specific maintenance activity (e.g., excavation, vegetation clearing, dangerous tree removal) and its timing, it could have some negative impacts to breeding eagles.

GSX-Canada

No site-specific impacts to nesting or breeding eagles were identified in the GSX-Canada studies (GSX-Canada, Volume 4, Section 7, pg. 89. April 2001).

Terasen Gas Alternative

No information on potential impacts to bald eagles of the Terasen Gas Alternative is available.

No Action Alternative

No information on potential impacts to bald eagles of the NorskeCanada proposal is available.

**Mitigation Measures**

GSX-US

WDFW's California Creek Bald Eagle Management Plan imposes the following conditions to protect the California Creek bald eagle territory:

- No excavation within 50 feet of the nest tree.
- No tree removal within 100 feet of the nest tree.
- All material removed for the trench and piled during pipe installation will be used to refill the trench and/or be spread on adjacent fields and will not remain piled within 50 feet of the nest tree.
- A report from a certified arborist, indicating the health of a danger tree and the need to remove the tree, shall be submitted to WDFW prior to cutting of a danger tree.
- Timing restrictions are strongly recommended for the area within 400 feet of the active nest, but not required.

In addition, mitigation measures on page 3-98 of the FERC Final EIS and FERC Condition 26 in the Final EIS call for pre-construction bald eagle surveys to be conducted by GSX-US according to protocols determined by USFWS and WDFW. The purpose of the surveys would be to determine if any new bald eagle nests have been established in the project vicinity, and that GSX-US would adhere to conditions in the habitat management plan.

A letter from the USFWS to FERC June of 2002 concurs with the GSX-US's determination of "may affect, not likely to adversely affect" for bald eagles. This concurrence is based on the assumption that all activities within 0.25 miles of active bald eagle nest sites that exceed ambient noise or disturbance levels would be restricted between August 15 and January 1 (i.e., the open construction window). In addition, the letter states that concurrence is based on the fact that "the project will not remove suitable habitat for listed terrestrial species", which includes bald eagles. Therefore, the proposed project is expected to avoid construction and operation activities within 0.25 miles of the California Creek nest territory between January 1 and August 15, and would not remove potential perch trees from the forested stand adjacent to Bertrand Creek (USFWS 2002).

GSX-Canada

No mitigation measures specific to bald eagles were included in GSX-Canada's environmental assessment. However, the document contained a number of general measures designed to minimize habitat disruption. The pipeline route was selected to avoid bisecting unfragmented forest interiors, to traverse agricultural land and existing clearings, as well as to follow existing rights-of-way and previous disturbances where practical. Where feasible, nests, dens, and breeding sites (e.g., nesting trees) for species of concern identified during the wildlife inventory and effect assessment prior to construction would be avoided by either realigning the pipeline right-of-way or by fencing an exclusion area during construction. Pre-clearing would be conducted in advance of peak timing for breeding migratory bird nesting (April 1 to July 31) if other critical scheduling elements permit. Where a conflict occurs between engineering requirements and confirmed sites, regional biologists would be consulted regarding the possibility of moving or reestablishing the site or appropriate compensation for the loss of the site (e.g., nest boxes for certain species). In the event that a listed species or species of concern is discovered during construction, the particular circumstance will be evaluated in consultation with provincial and federal resource agencies to determine the most appropriate course of action (GSX-Canada, Volume 4, Section 7, pg. 89. April 2001).

Terasen Gas Alternative

No information on potential impacts to bald eagles of the Terasen Gas Alternative is available.

No Action Alternative

No information on potential impacts to bald eagles of the NorskeCanada proposal is available.

**Significant Unavoidable Adverse Impacts**

If GSX-US adheres to the mitigation measures listed above, no significant unavoidable adverse impacts to breeding, roosting or foraging bald eagles would be expected.

### 3.5.10 Issue 23: Forest Fragmentation~~9~~

**Issue Summary**

Description of Problem

Assumptions regarding temporary forest habitat impacts are incorrect and forest fragmentation effects on wildlife are not quantified. On page 3-57 of the Final EIS, no discussion is provided of how many forested stands crossed by the pipeline are of significant size and thus could potentially have interior forest habitat. Data are presented in Appendix K of the Final EIS. However, that appendix does not specify the size of the forested stands. Many of them are simply listed as ">5" acres in size.

Ecology Requirement

Include data, a map, and discussion on what forested stands of significant size (if any) are fragmented in the environmental analysis.

**Affected Environment**

GSX-US

Based on a review of the most recent project maps, as well as aerial photographs of the project alignment and project vicinity, two large and relatively contiguous forested stands were identified that would be fragmented by the proposed pipeline right-of-way. These two stands are located between MP 23.5 and Interstate 5 and are shown in Figure 3-4. There is another stretch of forested habitat between MP 22.4 and MP 23.5. However, this forested area is significantly fragmented by rural residential homes, clearcuts, and roads. The two impacted stands are a combination of upland and wetland mixed deciduous/conifer forests. Page 3-57 of the FERC Final EIS states that the "loss of forest habitat and the creation of open early successional and induced edge habitats in these woodlots could decrease the quality of habitat for forest interior species for distances up to 300 feet from the right-of-way". Accordingly, 300 feet was used as the threshold between edge and interior forest habitat. Based on this criterion, the two stands shown in Figure 3-4 currently have approximately 100 and 43 acres, respectively, of interior forest habitat.

GSX-Canada

In the first 8 miles from landfall of the onshore corridor, the majority of forests have regenerated after turn-of-the-century logging. The coastal variety of Douglas fir is the most common species in upland forests with western red cedar, grand fir, arbutus, Garry oak, and red alder frequently associated. Less common trees include shore pine, Sitka spruce, western hemlock, bitter cherry, western flowering dogwood, bigleaf maple, black cottonwood, and trembling aspen.

In the remaining 7 miles of the onshore corridor, characteristic features are the prominence of western hemlock along with a substantial component of Douglas fir along and western red cedar. Grand fir, western white pine and bigleaf maple occur in warmer and drier, southern parts of the area. Red alder is widespread on logged or otherwise disturbed sites. Sitka spruce is also common in the south part of the area, particularly on specialized habits such as floodplains and exposed beaches (GSX-Canada, Volume 4, Section 5, pg. 20. April 2001).

Figure 3-4 Forest Stands Subject to Fragmentation

## Impacts

GSX-US

The proposed pipeline right-of-way would convert from 6 to 15 acres of the two forested stands. This fragmentation would be located in lower end of the larger stand, which minimizes overall impacts to the stand. The second stand is largely bisected by the proposed right-of-way, which will effectively eliminate interior forest habitat in that stand. However, this stand has experienced logging in the last ten years (based on aerial photographs), which has thinned a portion of the center of the stand and reducing the quality of interior habitat.

GSX-Canada

The clearing of pipeline right-of-way may alter the interiors of some forested communities through the introduction of an edge effect. The edge effect represents changes in vegetation that extend beyond the boundary of a forest ecosystem following the clearing of adjacent forest habitat and subsequent changes to the forest environment. Wind velocity is generally higher at forest edges, increasing the potential for tree damage caused by windthrow at or near the edge. In addition, edges have the potential to serve as corridors for the invasion of exotic species into previously unaffected areas (GSX-Canada, Volume 4, Section 7, pg. 77. April 2001).

Terasen Gas Alternative

No specific information on affected forested areas is available for the Terasen Gas Alternative.

No Action Alternative

No specific information on affected forested areas is available for the NorskeCanada proposal.

## Mitigation Measures

GSX-US

The current proposed alignment in this area minimized fragmentation impacts to the larger of the two forested stands. The Applicant has already made significant efforts to follow existing utility alignments. No further mitigation measures are recommended to offset forest fragmentation impacts.

GSX-Canada

Avoidance of significant communities such as old growth forests was an integral component in the routing strategy. Unfortunately, other routing criteria prevent complete avoidance. GSX-Canada efforts to minimize the direct loss of natural vegetation have reduced the overall magnitude by avoiding 4.3 acres of rare plant association, 1.8 acres of valued vegetation types and 9.6 acres of older forest habitat through route selection and refinement. In addition, numerous specimen trees were specifically avoided and the length of new edge reduced.

Few options are available to minimize edge effects. However, GSX-Canada has attempted, where feasible, to align the route on existing, or soon to be (i.e., prior to construction), cleared lands (approximately 2.4 miles), through revegetating cutblocks (approximately 0.4 miles) and along edges (approximately 2.8 miles) resulting in approximately 5.7 miles or 59% of the total terrestrial length crossing or following existing clearings. While routing along edges has some negative effect in that it shifts the edge effect deeper into forest habitats, it avoids bisection of habitat fragments, thereby retaining some of the fragments' interior forest characteristics.

Terasen Gas Alternative

No specific information on affected forested areas is available for the Terasen Gas Alternative.

No Action Alternative

No specific information on affected forested areas is available for the NorskeCanada proposal.

**Significant Unavoidable Adverse Impacts**

With the use of the proposed route and construction right-of-way, significant adverse impacts would not be expected.

### 3.5.11 Issue 24: Marine Mammal Noise Citations~~10~~

**Issue Summary**

Description of Problem

Richardson et al. (1995) is cited repeatedly in the Final EIS as the source of information concerning marine mammals and their relationship to underwater noise. This citation is not in the list of literature cited. This is a significant oversight since almost all of the conclusions regarding the potential effects of noise produced by the offshore portion of the pipeline are based on this citation.

Ecology Requirement

Provide complete references for all citations in the environmental review.

**Affected Environment**

Add the following citation to the Literature Cited section:

Richardson, W.J., C.R. Greene, Jr., C.I. Malme and D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press, San Diego, CA. 576 pp.

**Impacts**

Proposed Action

No additional analysis required.

Terasen Gas Alternative

No additional analysis required.

No Action Alternative

No additional analysis required.

**Mitigation Measures**

Proposed Action

No additional analysis required.

Terasen Gas Alternative

No additional analysis required.

No Action Alternative

No additional analysis required.

**Significant Unavoidable Adverse Impacts**

No additional analysis required.